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A comparison of the education systems in Turkey and Singapore and 1999-2011 timss tests results

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Abstract

This study is limited to TIMSS tests. The problem statement can be expressed as: "How the educations systems of Turkey and Singapore are differed?" "What are the results of Turkey and Singapore in TIMSS 1999-2007-2011?" This study is used literature method. Thank you to BAPKO for supporting my study.

Key words: Turkey, Singapore, education systems, TIMSS

1. INTRODUCTION

A Trend International Mathematics and Science Study (TIMSS) is a research study which examines students' achievement according to some variables in participant countries in every 4-year-period. This research was commissioned by International Association for the Evaluation of Educational Achievement (IEA). The first round of TIMSS took place in 1995 and the second round in 1999. It was the third round that made TIMSS famous worldwide It collects data on educational achievement from students at the 4th and 8th grades. It also collects extensive information from students, teachers and school principals about the teaching and learning of mathematics and science.

In 1999-2007, Turkey participated in TIMSS research at 8th grade level. Also, Turkey participated in TIMSS 2011with 4th and 8th grade students.

The fact that some Asian countries topped the achievement list in TIMSS amazed many people and drew the attention of the industrial countries. Consequently it induced the study on these high-performing Asian countries, namely, China, Korea, Japan, and Singapore (Yee, de Lange and Schmidt, 2006: 1663).

When the Mathematics section of this survey is examined, the contents can be determined with these items: fraction and number sense, measurement, data representation, analysis and probability, proportionality, geometry and algebra. Otherwise, when the Science part of this study is examined, the subjects of science can be separated in these items: life science, physical science, earth science, biology, chemistry, physics, earth science.

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Turkey is participated in TIMSS 1999, 2007 and 2011. But Singapore is participated in every TIMSS exams (1995, 1999, 2003, 2007 and 2011). Due to non-participation of Turkey in TIMSS 1995 and 2003 exams, these two applications were excluded from the scope of this study.

Each study of TIMSS involves approximately 50 countries and thousands of students in each participating country. 38 countries are participated in TIMSS 1999. After that, 59 countries are participated in TIMSS 2007. Finally, 57 countries with 4th grade students and 56 countries with 8th grade students are participated in TIMSS 2011.

1.1. Problem

The problem statement can be expressed as: "How the educations systems of Turkey and Singapore are differed?" "What are the results of Turkey and Singapore in TIMSS 1999-2007-2011?"

1.2. Sub-problems

The sub-problems of this study can be arranged as:

"1) How the compulsory education, primary and secondary education of Turkey and Singapore are differed?

2) What are the results of Turkey in TIMSS 1999-2007-2011?

3) What are the results of Turkey and Singapore in TIMSS 1999-2007-2011?

4) How the results of Singapore and Turkey in TIMSS 1999-2007-2011 can be compared?"

1.3. Aim

1. The aim of this study is to demonstrate the differences between TIMSS results (1999, 2007 and 2011) in Turkey and in Singapore.

2. METHOD

This study is used literature method. The definition of this method can be given as below: "All books, master and doctorate thesis, articles are examined and summarized in this type of study (Karasar, 2008)."

3. Comparisons of Education System and of TIMSS Surveys in Turkey and in Singapore

3.1. Comparison of Compulsory Education System in Turkey and in Singapore

In the table below, it can be showed comparatively the concept of compulsory education system in Turkey and in Singapore.

Table 1 : Turkey-Singapore Compulsory Education

Compulsory Education	
Turkey	**Singapore**
6-18 ages: 4+4+4 (4 year in primary, 4 year in middle school and 4 year in high school)	6-15 ages: 1-6 years in primary, 7-9 years in secondary (minimum 6 primary classes)

(12-year applications related to compulsory education Circular 2012/20, 09/05/2012, Compulsory education act, chapter 51, 2003)

As shown in the table 1, in 2012-2013 academic year, the duration of compulsory education Turkey upgrade from 8 years to 12 years (4+4+4: 4 years in primary, 4 years in college and 4 years in high school). In other words, 6-18 years are included in the compulsory education system. But, in Singapore, the compulsory education is covered students who have from 6 to 15 years old.

3.2. Comparisons of Primary Education System in Turkey and in Singapore

In the table below, it can be demonstrated comparatively the primary education system in Turkey and in Singapore.

Table 2: Turkey-Singapore Primary Education System

Turkey-Singapore Primary Education System	
Turkey	**Singapore**
6-10 ages: 1-4 classes: 4 year primary	6-12 ages: 1-6 classes: 6 year primary

(Hodge, 2012, http://multilingualphilippines.com/?p=6344)

As shown in table 2, within the scope of 12-years compulsory education, in Turkey, the primary level involves 1st-4th grade. But in Singapore, the primary level takes 1st-6th grades (6-12 years).

3.3. Comparisons of Secondary Education System in Turkey and in Singapore

In the table below, it can be given comparatively the secondary education system in Turkey and in Singapore.

Table 3: Turkey-Singapore Secondary Education System

Turkey-Singapore Secondary Education System	
Turkey	**Singapore**
11-14 ages: 5-8 classes: 4 year in secondary	13-18 ages: 7-12 classes: 5 year in secondary

(Hodge, 2012, http://multilingualphilippines.com/?p=6344)

As shown in the table 3, in Turkey, within the scope of 12-year compulsory education system, the college covers 5^{th}-8^{th} grades (11-14 years). But in Singapore, the secondary level involves 7^{th}-12^{th} grades (13-18 years).

3.4. Comparisons of Mathematics Lessons

In the table below, it can be showed comparatively the mathematics lessons in Turkey and in Singapore.

Table 4: Comparisons of Singapore-Turkey Mathematics Lesson Hours

Comparisons of Singapore-Turkey Mathematics Lesson Hours			
	Weekly Lesson Hours	**Percentage of Mathematics Lessons in Weekly Curriculum**	**Annual Mathematics Lesson Hours**
Singapore	29	13	124
Turkey	27	11	95

(Şişman, Acat, Aypay and Karadağ, 2007)

As shown in table 4, the weekly lesson hours are 29 in Singapore. But, the weekly lesson hours are 27 in Turkey. The percentage of mathematics lesson in weekly curriculum is 13 % in Singapore. But, the percentage of mathematics lessons in weekly curriculum is 11 % in Turkey. The annual mathematics lesson hours are 124 in Singapore. But, the annual mathematics lesson hours are 95 in Turkey.

3.4.2. Comparisons of Science Lessons

In the table below, it can be demonstrated comparatively the mathematics lessons in Turkey and in Singapore.

Table 5: Comparisons of Singapore-Turkey Science Lesson Hours

Comparisons of Singapore-Turkey Science Lesson Hours			
	Weekly Lesson Hours	**Percentage of Science Lessons in Weekly Curriculum**	**Annual Science Lesson Hours**
Singapore	23	15	14
Turkey	20	10	8

(Şişman, Acat, Aypay and Karadağ, 2007)

As shown in table 5, the weekly lesson hours are 23 in Singapore. But, the weekly lesson hours are 20 in Turkey. The percentage of science lesson in weekly curriculum is 15 % in Singapore. But, the percentage of science lessons in weekly curriculum is 10 % 20 in Turkey. The annual science lesson hours are 14 in Singapore. But, the annual science lesson hours are 8 in Turkey.

3.5. Comparisons of TIMSS Tests Results in Turkey and in Singapore

3.5.1. Comparisons of TIMSS 1999 Tests Results in Turkey and in Singapore

Turkey is participated in TIMSS 1999 with 2204 schools and 7841 students. But Singapore participated in TIMSS 1999 with 5000 in 8^{th} grade students (International Study Center, 2000, Martin, Gregory and Stemler, 2000).

In the table below, it can be given comparatively TIMSS 1999 international average of mathematics and science achievement and mathematics and science scores in Singapore, in Turkey.

Table 6 Comparisons of Singapore-International Average-Turkey in TIMSS 1999 Mathematics Achievement

	TIMSS 1999 Mathematics Achievement	TIMSS 1999 Science Achievement
Singapore	604	568
International Average	487	488
Turkey	429	433

(International Study Center, 2000)

As shown in table 6, when the mathematics scores of TIMSS 1999 are compared, it is seen that Singapore is ranked 1st with 604 scores. The international average of 487 was obtained by averaging across the mean scores for each of the 38 participating countries. Turkey is ranked 31rd among 38 countries with 429 scores. Also when the science scores of TIMSS 1999 are compared, Singapore is ranked 2nd country with 568 scores. The international average of this exam is 488. Turkey is ranked 33st among 38 countries with 433 scores.

3.5.2. Comparisons of TIMSS 2007 Tests Results in Turkey and in Singapore

Turkey participated in TIMSS 2007 with 16.112 schools and 1.163.830 in 8th grade students. But Singapore participated in TIMSS 2007 with 177 schools and 49.363 in 4th grade students and 164 and 50.904 in 8th grade students (Olson, Martin and Mullis, 2009).

In the table below, it can be demonstrated comparatively TIMSS 2007 international average of mathematics and science achievement and mathematics and science scores in Singapore, in Turkey.

Table 7: Comparisons of Singapore-International Average-Turkey in TIMSS 2007 Mathematics Achievement

TIMSS 2007 Mathematics Achievement			TIMSS 2007 Science Achievement		
	4th	8th		4th	8th
Singapore	599	593	**Singapore**	587	567
International Average	500	500	**International Average**	500	
Turkey		432	**Turkey**		454

(Mullis, Martin and Foy, 2009, Şişman, Acat, Aypay and Karadağ, 2007, Martin, Mullis and Foy, 2009)

As shown in table 7, Singapore is ranked 2nd country with 599 scores among 4th grade students. But this country is ranked 3rd country with 593 scores. The international average of this exam is 500. Turkey is participated this survey only in 8th grade students. Turkey is ranked is ranked 30th with 432 scores. Also when the science scores of TIMSS 2007 are compared, Singapore is ranked 1st country with 587 scores among 4th grade students. But this country is ranked 1st country with 567 scores. The international average of this exam is 488. Turkey is ranked 31th among 38 countries with 454 scores.

3.5.3. Comparisons of TIMSS 2011 Tests Results in Turkey and in Singapore

In Turkey, this exam is realized in April 2011 with 257 schools and 7.479 students in 4th grade and 239 schools and 6928 students in 8th grade.

TIMSS was administrated at grade 4 in 57 countries and at grade 8, in 56 countries (Katsberg, Ferrarro, Lemanski, Roey and Jenkins, 2013).

In the table below, it can be showed comparatively TIMSS 2011 international average of mathematics and science achievement and mathematics and science scores in Singapore, in Turkey.

Table 8: Comparisons of Singapore-International Average-Turkey TIMSS 2011 Mathematics Achievement

TIMSS 2011 Mathematics Achievement			TIMSS 2011 Science Achievement		
	4th grade	8th grade		4th grade	8th grade
Singapore	606	611	**Singapore**	583	590
International Average	500	500	**International Average**	500	500
Turkey	469	452	**Turkey**	463	483

(Yücel, Karadağ and Turan, 2013, Martin, Mullis, Foy and Stanco, 2012)

As shown in table 8, Singapore is ranked 1st country with 606 scores among 4th grade students. But this country is ranked 2nd country with 611 scores. The international average of this exam is 500. Turkey is participated this survey in 4th and 8th grade students. Turkey is ranked 35th with 469 scores among 4th students. And it is ranked 24th with 452 scores among 8th students Also when the science scores of TIMSS 2011 are compared, Singapore is ranked 2nd country with 583 scores among 4th grade students. But this country is ranked 1st with 567 scores among 8th grade students. The international average of this exam is 488. Turkey is ranked 36th with 463 scores among 4th grade students. But it is ranked 21th with 483 scores among 8th grade students.

4. DISCUSSIONS

Salehi-Isfahani, Hassine and Assaad (2011) prepared an article with this title "Equality of Opportunity in Education in the Middle East and North Africa." The inequality of opportunities explains a significant part of the inequality in educational achievements in most Middle East and North Africa (MENA) countries, but in a few cases, notably Algeria, its role is small. Family background variables are the most important determinants of inequality in achievement, followed by community characteristics. Inequality of education opportunities are high in several MENA countries, and have either stayed the same or worsened in recent years. The results show that, despite great efforts in past decades to invest in free public education, in most MENA countries there is plenty of room left in further levelling the playing field in education.

Öztürk and Uçar (2010) wrote an article with this title "determination and comparison of factors, which effect the achievement in science of 8th grade students, using the results of TIMSS exams in Taiwan and Turkey. These countries have some differences in socio-economic situations, the budget of education, the education conditions of parents, the instruction of teachers and the programs. That's why, in Taiwan, the students are successed in two domains of TIMSS exams.

Bouhlila (2012) wrote an article with this title "The quality of secondary education in the Middle East and North Africa: what can we learn from TIMSS' results?" The research questions addressed here are why is achievement low? And why is the gap between the top-performing countries and MENA countries large? In order to answer these questions, the paper focuses on several aspects: the first is the inefficiency of acquiring the language, the second is the inefficiency of time devoted to homework, the third is the meagre intended curriculum which is translated into a weaker implemented curriculum, the fourth aspect deals with the inefficiency of public resources devoted to the education sector. Finally, the paper highlights two other factors believed to affect students' achievement: family background and students' attitudes towards mathematics and science.

2. Ghagar, Othman and Mohammadpour (2011) prepared an article with this title "Multilevel analysis of achievement in mathematics of Malaysian and Singaporean students." The results indicated that 57,28 % of the total variance in mathematics achievement in Malaysia accounted for school-level differences. Meanwhile, the results showed that classroom-level differences contributed to 74,6 % of the total variance in achievement of Singaporean students. Only 5,9 % of the variance in achievement in Singapore accounted for school-level differences. At the student level, mathematics self-concept was the most influential factor on achievement of students from both countries. At the school level, school climate as perceived by the school principals was the most influential factor on achievement of students from both countries.

Uzun, Bütüner and Yiğit (2010) prepared an article with this title "A Comparison of the Results of TIMSS 1999-2007: The Most Successful Five Countries-Turkey Sample." According to results of TIMMS 1999 & 2007, students from East Asian countries were the top performers in science and mathematics. The findings obtained by TIMSS 1999 & 2007 showed that Turkish students' low achievement cannot be explained by the variables that are attitude, time spent on homework or the education level of parents.

Aslan and Kaptan (2007) prepared an article with this title "A comparison with the relationship between the changes in the program of teaching science and the program of instruction teacher: an example of Turkey and Singapore." In two countries, the programs of teaching science have a large content. But in Singapore, the science teachers have more cultural knowledge than Turkish science teachers. Also, Turkish science teachers receive a little instruction in service. Otherwise, they can be supported a little about references and the techniques of learning science. That's why, in Singapore, the students took part in first or second range in science in TIMSS-R exams.

5. CONCLUSION

5.1. Results

The results of this study are given below:

1) According to compulsory education act, in Singapore, the children must be educated in school from 6 to 15 ages.

2) According to curricular 12-year compulsory education, in Turkey, the children must go to school from 5/6 to 17/18 ages.

3) According to compulsory education act chapter 51, in Singapore, the primary level takes 6 years (6-12 ages).

4) According to curricular 12-year compulsory education, in Turkey, the primary level takes 4 years (5/6-9/10 ages).

5) The secondary level takes 6 years (12-18 ages) in Singapore.

6) The secondary level takes separately 4 years in middle school (9/10-13/14 ages) and 4 years (13/14-17/18 ages) in high school in Turkey.

7) The weekly lesson hours are 29 in Singapore. But, the weekly lesson hours are 27 in Turkey. The percentage of mathematics lesson in weekly curriculum is 13 % in Singapore. But, the percentage of mathematics lessons in weekly curriculum is 11 % in Turkey. The annual mathematics lesson hours are 124 in Singapore. But, the annual mathematics lesson hours are 95 in Turkey.

8) The weekly lesson hours are 23 in Singapore. But, the weekly lesson hours are 20 in Turkey. The percentage of science lesson in weekly curriculum is 15 % in Singapore. But, the percentage of science lessons in weekly curriculum is 10 % 20 in Turkey. The annual science lesson hours are 14 in Singapore. But, the annual science lesson hours are 8 in Turkey.

9) In TIMSS 1999, Singapore is ranked 1st with 604 scores. The international average of 487 was obtained by averaging across the mean scores for each of the 38 participating countries. Turkey is ranked 31rd among 38 countries with 429 scores. Also when the science scores of TIMSS 1999 are compared, Singapore is ranked 2nd country with 568 scores. The international average of this exam is 488. Turkey is ranked 33st among 38 countries with 433 scores.

10) In TIMSS 2007, Singapore is ranked 2nd country with 599 scores among 4th grade students. But this country is ranked 3rd country with 593 scores. The international average of this exam is 500. Turkey is participated this survey only in 8th grade students. Turkey is ranked is ranked 30th with 432 scores. Also when the science scores of TIMSS 2007 are compared, Singapore is ranked 1st country with 587 scores among 4th grade students. But this country is ranked 1st country with 567 scores. The international average of this exam is 488. Turkey is ranked 31th among 38 countries with 454 scores.

11) In TIMSS 2011, Singapore is ranked 1st country with 606 scores among 4th grade students. But this country is ranked 2nd country with 611 scores. The international average of this exam is 500. Turkey is participated this survey in 4th and 8th grade students. Turkey is ranked 35th with 469 scores among 4th students. And it is ranked 24th with 452 scores among 8th students Also when the science scores of TIMSS 2011 are compared, Singapore is

ranked 2nd country with 583 scores among 4th grade students. But this country is ranked 1st with 567 scores among 8th grade students. The international average of this exam is 488. Turkey is ranked 36th with 463 scores among 4th grade students. But it is ranked 21th with 483 scores among 8th grade students.

5.2. Suggestions

The suggestions for other researchers are demonstrated below:

1) From 1999 to 2011, the mathematics section TIMSS test results can be compared in Turkey and in Singapore.
2) From 1999 to 2011, the science part TIMSS test results can be compared in Turkey and in Singapore.
3) From 1999 to 2011, the mathematics section TIMSS test results can be compared in Turkey and in other ME countries.

The suggestions for Turkey are explained below:

1) The teachers can be informed about TIMSS surveys in-service education programs.
2) The teachers can try to solve previous TIMSS surveys with their students.
3) The students can be informed about TIMSS exams in different seminars.

References

12-year Applications Related to Compulsory Education, Circular 2012/20, (2012). 09/05/2012, Retrieved from http://www.meb.gov.tr/haberler/2012/12YillikZorunluEgitimeYonelikGenelge.pdf (01.05.2013).
Aslan, F. and Kaptan, F. (2007). Fen Bilgisi Ögretim Programlarındaki Değişimlerin Öğretmen Yetiştirme Programları İle İlişkilendirilerek Karşılaştırılması: Türkiye ve Singapur Örneği. Azeribaijan: Muallim Hazırlama Siyasati ve Problemlari Beynalxalq Konfransı, 12-14 May 2007, 249-253.
Bouhlila, D. S. (2012). The quality of secondary education in the Middle East and North Africa: What Can We Learn From TIMSS' Results?. *Journal of Comparative International Education*, *vol: 41*, no: 3, 327-352.
Compulsory Education Act, Chapter 51 (2003). 01/01/2003 Retrieved from http://planipolis.iiep.unesco.org/upload/Singapore/Singapore_Compulsory_Education_Act.pdf (19.06.2013).
Ghagar, M.N. Abd., Othman, R. and Mohammadpour, E. (2011). Multilevel Analysis of Achievement in Mathematics of Malaysian and Singaporean Students. *Journal of Educational Psychology and Counseling*, vol: 2, June 2011, 285-304.
Hodge, W. (2012). Singapore Basic Education Curriculum Revisited: A Look at the Current Content and Reform. Retrieved from http://multilingualphilippines.com/?p=6344 (08/06/2013).
International Study Center (2000). TIMSS 1999 (TIMSS-R) Released Science Items. Retrieved from http://timssandpirls.bc.edu/timss1999i/pdf/t99science_items.pdf (08.06.2013).
Karasar, N. (2008). *Bilimsel Araştırma Yöntemleri*. Ankara: Pegem A Publications.
Katsberg, D., Ferrarro, D., Lemanski, N., Roey, S. and Jenkins, F. (2013). Highlights from TIMSS 2011 (Mathematics and Science Achievement of U.S. Fourth and Eigth-Grade Students in an International Context). USA: Washington, NCES, IES Department of Education. Retrieved from http://nces.ed.gov/pubs2013/2013009_1.pdf (10.06.2013).
Martin, M. O., Mullis, I. V.S., Foy P. and Stanco, G. M. (2012). TIMSS 2011 International Results in Science. USA: Chestnut Hill, MA, TIMSS & PIRLS International Study Center, Retrieved from http://timssandpirls.bc.edu/timss2011/downloads/T11_IR_Science_FullBook.pdf (04/06/2013).
Martin, M. O., Mullis, I.V. S., and Foy, P. (2009). TIMSS 2007 International Science Report Chapter 1: International Student Achievement in Mathematics, USA: Boston College, Chestnut Hill, TIMSS & PIRLS International Study Center, Retrieved from http://timss.bc.edu/timss2007/PDF/TIMSS2007 InternationalScience Report.pdf (17.06.2013).
Martin, M. O. Gregory K. D. and Stemler, S. E. (2000). TIMSS 1999 Technical Report. IEA's repeat of the third international mathematics and science study at the Eigth Grade, Chestnut Hill, MA: Boston College, Retrieved from http://timssandpirls.bc.edu/timss1999i/pdf/T99_TR.book.pdf (04/06/2013).
Mullis, Martin, Foy, (Edited by) (2009). TIMSS 2007 International Mathematics Report. Chapter 1: International Student Achievement in Mathematics, USA: Boston College, Chestnut Hill, TIMSS & PIRLS International Study Center, Retrieved from http://timss.bc.edu/timss2007/PDF/TIMSS2007_InternationalMathematicsReport.pdf (04/06/2013).
Olson, J. F., Martin, M.O., Mullis, I. V. (Edited by) (2009). *TIMSS 2007 Technical Report*. Joncas, M.: Chapter 9: TIMSS 2007 Sampling Weights and Participation Rates. Retrieved from http://timss.bc.edu/timss2007/PDF/TIMSS2007_TechnicalReport.pdf, 163-164.
Öztürk, D. and Uçar, S. (2010). TIMSS Verileri Kullanılarak Tayvan ve Türkiye'deki 8. Sınıf Öğrencilerinin Fen Başarısına Etki Eden Faktörlerin Belirlenmesi ve Karşılaştırılması. *Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi, vol 19,* no 3, 241-256.
Salehi-Isfahani, D. Hassine, N.B. and Assaad, R. (2012). Equality of Opportunity in Education in the Middle East and North Africa. Working papers e07-33, Virginia Polytechnic Institute and State University, Department of Economics, 1-48. Retrieved from http://filebox.vt.edu/users/salehi/achievement.pdf (15.05.2013).
Şişman, M., Acat, M. B., Aypay, A. and Karadağ, E. (2007). TIMSS 2007 National Mathematics and Science Report 8th grade students. Ankara: EARGED Publications. Retrieved from http://www.vitaminogretmen.com/_docs/pdf/TIMSS_2007_TURKIYE_ULUSAL_RAPOR_SINIF8.pdf (04/06/2013).
TIMSS 2011 Tanıtım Kitapcığı Uluslararası Matematik ve Fen Eğilimleri Araştırması. Ankara: MEB EARGED Retrieved from http://egitek.meb.gov.tr/pdf/ TIMSS_2011_kitapcigi.pdf (04/06/2013).
TIMSS 1999 National Report, Retrieved from http://egitek.meb.gov.tr/dosyalar%5Cdokumanlar%5Culuslararasi/timss_1999_ulusal_raporu.pdf (04/06/2013).
Uzun, S., Bütüner, S. Ö. and Yiğit N. (2010). 1999-2007 TIMSS Fen Bilimleri ve Matematik Sonuçlarının Karşılaştırılması: Sınavda En Başarılı İlk Beş Ülke-Türkiye Örneği. *Elementary Education Online Journal*, 9(3), 1174-1188.

Yee, L.P., De Lange, J. and Schmidt, W. (2006). What are PISA and TIMSS? What do they tell us? Panel B, *Proceedings of the International Congress of Mathematicians*, Spain: Madrid, 2006 European Mathematical Society, 1663-1672 (1663).
Yücel, C., Karadağ, E. ve Turan, S. (2013). TIMSS 2011 Ulusal Ön Değerlendirme Raporu (Eğitimde Politika Analizi Raporlar Serisi I). Eskisehir: Eskisehir Osmangazi Üniversitesi. Retrieved from http://www.egitim.ogu.edu.tr/upload/Dokumanlar/TIMSS_2011.pdf (03/06/2013).